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Disassortative Sexual Mixing among Migrant Populations in the Netherlands: a Potential for HIV/STI Transmission?

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For Peer Review Only

Abstract

To gain insight into the transmission of HIV and STI among large migrant groups in the Netherlands, we studied the associations between their demographic and sexual characteristics, in particular condom use, and their sexual mixing patterns with other ethnic groups. In 2002-2005, cross-sectional surveys were conducted among migrants from Surinam (Afro- and Hindo-), the Netherlands Antilles, Cape Verde, and Ghana at social venues in three large cities. A questionnaire was administered and a saliva sample was collected for HIV antibody testing. Of 2105 migrants recruited, 1680 reported sexual contacts, of whom 41% mixed sexually with other ethnicities, including the indigenous Dutch population. Such disassortative mixing was associated with being second generation migrants, having several sexual partners, and having a steady and concurrent casual partner. Less disassortative mixing occurred in participants reporting visiting the country of origin. The association between condom use and sexual mixing differed by gender, with men using condoms inconsistently being most likely to be mixing with the Dutch indigenous population. HIV infection and recent STI treatment were not associated with disassortative mixing. This study shows substantial sexual mixing among migrant groups. Since disassortative mixing is more prevalent in second generation migrants, it might increase in the upcoming years. The mixing patterns in relation to concurrency and the reported condom use in this study suggest a possibly increased level of HIV/STI transmission not only within migrant groups but also between migrant groups, especially via men who mix with the indigenous population and via migrant women who mix with non-Dutch casual partners. Although the observed HIV prevalence in migrants (0.6%) is probably too low to lead

to much HIV transmission between ethnicity groups, targeted prevention measures are needed to prevent transmission of other STI.

Keywords: migrants; Netherlands; sexual mixing; concurrency

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Introduction

Over the years, the number of HIV diagnoses in Europe has increased among persons infected through heterosexual contact, mainly because diagnoses have increased among persons originating from countries with generalized HIV epidemics (EuroHIV, 2006). This rise has also been observed in the Netherlands (Op de Coul, Fennema J.S., & Hoek J. van de, 2003), but has recently leveled off, possibly because of more restrictive asylum policies (Veen MG van et al., 2007).

In the Netherlands, migrants originating from Surinam and the Antilles (two former Dutch colonies) form one of the largest migrant groups (CBS). In addition, we have a large community of sub-Saharan Africans (CBS). In 1997, HIV prevalence was 0.8% among migrants from the Netherlands Antilles, 0.3% among Afro-Surinamese and 1.8% among Ghanaian migrants living in Amsterdam (Gras, Weide, Langendam, Coutinho, & van den Hoek, 1999). These prevalences are higher than the estimated prevalence of 0.2% for the general population in the Netherlands in 2005 (Op de Coul, Sighem, & Laar, 2006).

The importance of migration in the spread of HIV/STI has been discussed widely (Quinn, 1994) and it is considered as one of many social factors that have contributed to the AIDS epidemic (Decosas & Adrien, 1997). Mobile populations or people who have recently changed residence are likely to be at higher risk for HIV, in particular migrant men (Lurie et al., 2003). Social networks may power the spread of HIV (Morris, 1997; Rothenberg et al., 1998) and mixing patterns influence the risk of specific infections (Aral et al., 1999). Hertog described that disassortative sexual mixing in combination with high rates of partner change tend to increase the overall size of the HIV epidemic (Hertog, 2007). Studies of socio-cognitive

determinants of protective behavior among migrants from HIV endemic areas are limited.

Wiggers et al. showed that next to social cognitive factors specified by the theory of planned behaviour, the effect of ethnicity of the partner, also was a significant determinant of condom use in ethnic minorities (Wiggers, de Wit, Gras, Coutinho, & van den Hoek, 2003).

In a previous study among migrants in the Netherlands, sexual contacts in the country of origin were frequently reported, as were sexual contacts between ethnicity groups in the Netherlands (Gras, Weide, Langendam, Coutinho, & van den Hoek, 1999). In 2005, another study showed that older male travelers of Surinamese and Antillean origin are at risk for cross-border heterosexual transmission of HIV and sexually transmitted infections (STI) because of their frequent travel to the home country and their unprotected sexual contacts in both countries (Kramer MA et al., 2008). However, little is known about the potential for HIV/STI transmission within and among migrant groups. To gain insight into these dynamics, we studied how condom use and other risk-related characteristics of Surinamese, Antillean, and sub-Saharan African migrants living in the Netherlands, might be associated with their sexual mixing patterns with other ethnic groups, including the indigenous Dutch population.

Methods

Study population and methods

From 2002 to 2005, cross-sectional community-based HIV surveys were carried out in three large urban areas (Rotterdam, Amsterdam, and The Hague) in the Netherlands among migrants from HIV-endemic countries i.e. countries with an estimated adult HIV prevalence over 1%.

Participants were included in the study if they or one of their parents were born in Surinam, the Netherlands Antilles, Aruba, Ghana, or Cape Verde; if they were aged between 18 and 55 years, and currently lived in the Netherlands. Professionally instructed interviewers approached potential participants at cultural meeting places, such as community centers, festivals, and churches. Based on notes of the recruitment team, the participation among migrants approached was about 60%. Those who declined, stated that they did not have time, did not want to talk about their sexual behavior, or that they might participate at another time. No demographic differences between responders and non-responders were observed. Interviewers indicated that migrant-mothers accompanied by their children were more reluctant to participate as were men in the companionship of their wife.

Participants were interviewed face-to-face, using a structured questionnaire covering demographic characteristics, sexual behavior, ethnicity of sexual partners, visits to the country of origin, and HIV/STI testing. Subsequently, a saliva sample was collected for HIV antibody testing by enzyme linked immuno-assay (ELISA), Wellcozym GACELISA (Murex Diagnostics, Abbott Park, USA) was used in 2002, and Vironostika (BioMerieux, France) in 2003-2005, as GACELISA was no longer available. Reactive samples were retested with the

VIDAS HIV duo (BioMerieux, France). Those reactive on the second ELISA were classified as HIV-positive. Non-reactive samples on the second ELISA were subjected to a Western Immunoblot (InnoLia, Innogenetics, Belgium), to achieve the decisive test result. All respondents received 10 euros to cover any expenses for participation. The ethical committees of TNO Research and the Academic hospital in Utrecht, which are acknowledged by the national body involving research on human subjects, approved the study. Verbal informed consent was obtained of all participants.

Statistical analysis

Multinomial regression analyses were used to study the association between condom use and other characteristics with sexual mixing. For the analyses, participants were categorized into four mixing groups for potentially intercultural transmission of STI/HIV, based on the ethnicity of their most recent one to four sexual partner(s) in the six months preceding the study: (1) assortative mixing only (reference group), (2) disassortative mixing with indigenous Dutch, (3) disassortative mixing with non-Dutch, (4) disassortative mixing with both indigenous Dutch and non-Dutch partners. If a participant had more than 4 partners in the past 6 months, information was obtained on the 4 most recent partners to limit recall bias and because of the maximum length of the interview. Only participants with at least one heterosexual (non-commercial) partners were included (n = 1680/2105). Disassortative sexual mixing was defined as a sexual partnership in which the ethnicity differed. Ethnicity of the participant was defined by country of birth. If the participant was born in the Netherlands, the parents' country of birth determined ethnicity, with the mother's being decisive. Ethnicity of the partner(s) was defined by the participant.

For the analyses, all variables that were significantly associated with the outcome variable ($p < 0.10$) in the univariate analysis were considered for entry in the multivariate model (backwards selection). Condom use was included in all models since this was our main variable of interest. It was divided into three categories: (1) consistent condom use with all partner(s) (either steady and/or casual), (2) inconsistent condom use with steady partner but, if having casual partners, consistent condom use with them and (3) inconsistent condom use with casual partner(s), regardless of consistent or inconsistent condom use with steady partners. Potential other determinants evaluated were demographic factors, sexual behavior other than condom use, visits in country of origin, and HIV/STI testing behavior. Demographic factors included the sex and ethnicity of the participant; age, country of birth, and years of residence in the Netherlands; educational level, marital status, and generation (defined by country of birth of the participant). Sexual determinants included total number of reported partners in the past 5 years; having only a steady partner; having only casual partners (with detailed information on the 4 most recent partners in the six months preceding the study); having a concurrent casual partner while having a steady partner (i.e., for at least 6 months); having commercial sex contacts, and having anal sex contacts. Travel behavior was defined by one or more visit to the country of origin in the 5 years preceding the study. HIV/STI testing behavior included STI treatment, HIV testing history, and results of prior HIV testing. We checked for interactions with gender in the final model. Finally, we repeated our analyses on sexual mixing, focusing only on participants reporting two or more partners ($n = 557/1680$). Analyses were carried out using the SAS software 9.1.3 (SAS Institute, Inc., Cary, North Carolina).

Results

Characteristics of the study population

In total, 2105 participants were enrolled in the study between 2002 and 2005, of whom 1193 were men (57%). Of the total, 328 (16%) were Hindo-Surinamese migrants, 449 (21%) Afro-Surinamese, 710 (34%) Antilleans, 425 (20%) Ghanaian, and 193 (9%) Cape Verdeans. Of all participants, 77% were born in the country of origin (first-generation migrants) with a median age at migration of 20 years. Antillean and Ghanaian migrants were more often first-generation migrants than were Hindo-, Afro-Surinamese, or Cape Verdean migrants (90%, 86% versus 63%, 65%, 57%, respectively). Eleven saliva samples tested positive for HIV antibodies (0.6% [95% CI 0.3-1.0%]). Of all migrants, 340 (16%) reported an STI check up in the previous year. Of those tested, 22% had been treated for an STI.

(Table 1)

Associations with disassortative sexual mixing

Of the 2105 participants, 1680 (80%) reported sexual contacts with at least one non-commercial steady and/or casual partner, with known ethnicity. As shown in Table 1, 986 (59%) reported partners of the same ethnicity or assortative mixing (group 1, reference group); 244 (15%) reported only indigenous Dutch partners (group 2); 361 (21%) reported non-Dutch disassortative mixing (group 3), and 89 (5%) reported disassortative mixing with both indigenous Dutch and non-Dutch partners (group 4).

The multivariate multinomial regression analyses found significant associations between the three disassortative mixing groups and gender, condom use, concurrent casual

partner, ethnicity, second-generation migrants, educational level, number of partners in the previous 5 years, and visits to home country (Table 2). Condom use and gender were combined in the multivariate analyses, since we found a significant interaction between these variables.

Compared to women who use condoms consistently, men who inconsistently used condoms with steady partners or with casual partners were more likely to mix with only indigenous Dutch (group 2). Also, men who inconsistently used condoms with casual partners were more likely to be in the 4th group, mixing with both indigenous Dutch and non-Dutch. Women who inconsistently used condoms with steady partners were less likely to mix with Dutch persons only or with both Dutch and non-Dutch than were women who used condoms consistently. In contrast, women reporting inconsistent condom use with casual partners were more likely to mix only with partners of non-Dutch ethnic origin than were women who used condoms consistently. Participants with a concurrent casual partner were more likely to mix disassortatively, whereas participants who visited the home country were less likely to mix disassortatively, regardless of the ethnicity of the disassortative partners. Afro-Surinamese migrants were more likely to mix with Dutch partners and also with partners of different non-Dutch ethnic background. In contrast, Hindo-Surinamese were less likely to mix with non-Dutch partners. Second-generation migrants were more likely to mix with Dutch only and also with non-Dutch. Participants with 4 or more reported sexual partners were more likely to mix with both Dutch and non-Dutch. In addition, participants reporting 7 partners or more were more likely to mix with non-Dutch. Those with middle educational level were less likely to have Dutch partners, whereas those with a high educational level were more likely to have non-Dutch partners.

(Table 2)

Associations with disassortative sexual mixing in participants with two or more partners

Of all participants, 557 (26%) reported two or more partners with known ethnicity (Table 3). Compared to women with two or more partners who consistently used condoms, men in all three groups of condom use were more likely to mix with indigenous Dutch. In addition, men who consistently used condoms with all partners or men who inconsistently used condoms with steady partners only were more likely to mix with both Dutch and non-Dutch partners. Participants who traveled to their home country were less likely to mix with both Dutch and non-Dutch partners. The analysis of the total group (n = 1680), the same was true for mixing with Dutch only and mixing with non-Dutch only. However, the number of participants included in the analysis was smaller (n = 557).

(Table 3)

Discussion

Our main finding is that a substantial proportion of migrants mixed sexually with persons of other ethnicities, including the indigenous Dutch population. Since disassortative mixing increases from first- to second-generation migrants, it is likely to increase further in the coming years. We were especially interested in the association between condom use and sexual mixing. This effect differed by gender, with men in general being more likely to mix disassortatively than women, and men who inconsistently used condoms with casual partners being more likely to mix with both indigenous Dutch and non-Dutch. These findings indicate that especially men using condoms inconsistently are the bridge for HIV/STI transmission between different population groups.

Because cultural values are shared within ethnic groups, individuals are more likely to have relationships with members of their own groups than with others. Of our subjects, 59% reported assortative mixing patterns, which is lower than in a study among American adolescents reporting 78% assortative ethnic mixing (Ford, Sohn, & Lepkowski, 2002). Some studies support the view that assortative mixing fuels the spread of STI within subpopulations (Aral, 2000; Laumann & Youm, 1999). This suggests that assortative mixing may actually reduce the transmission of STI between subpopulations. Of migrants who reported STI testing in our study, 22% had an STI diagnosed, which is comparable with 21% positive STI diagnoses among Surinamese and Antillean who visit STI clinics (Veen MG van et al., 2007). A survey among black Africans in England found that 22% of respondents had previously had an STI diagnosis (Sadler et al., 2007). These findings support the suggestion that within

migrant groups, in which inconsistent condom use is high in steady partnerships, assortative mixing contributes to the transmission of STI within the subpopulation.

We found that second generation migrants were more likely to mix disassortive than first generation migrants. Second generation migrants are likely to assimilate better to the culture of the country of residence than first generation migrants and are therefore more likely to choose sexual partners of the indigenous population in the country of residence. The tendency of conforming behaviour is subscribed by a study by Hosper et al. (2007) in which they showed that behavioural risk factors (e.g. smoking, physical inactivity) in two generations of non-Western migrants seem to converge towards the prevalence rates in the Dutch population (Hosper, Nierkens, Nicolaou, & Stronks, 2007). First generation migrants might hold on to their own culture, as they were not born in the country of residence. The proportion migrants who have a partner of another ethnic group will likely increase the coming years, since more second generation migrants' turn into adults and first generation migrants giving birth to the next generation.

We found that having a concurrent casual partner was reported by almost one in four migrants and that concurrency is associated with disassortative mixing. Its prevalence in our study is high when compared to American studies that, for example, found 12% concurrent sexual partnerships among American women and 11% among American men (Adimora et al., 2002; Adimora, Schoenbach, & Doherty, 2007). Concurrency is an important factor in the spread of HIV/STI (Morris & Kretzschmar, 1997) and has been cited to help explain Africa's high HIV prevalence (Halperin & Epstein, 2004). Concurrent partnerships may involve in either assortative or disassortative mixing. Partnerships that involve the latter, as concurrent partners, can rapidly accelerate the spread of STI/HIV in a population (Koumans et al., 2001;

Doherty, Shiboski, Ellen, Adimora, & Padian, 2006; Gorbach, Drumright, & Holmes, 2005). In our study, concurrency was independently associated with disassortative mixing with Dutch and/or non-Dutch in multivariate analyses. In some groups, having concurrent sexual partners is culturally accepted. Although this could affect the transmission of HIV, rates of HIV-infection remain relatively low in these migrant groups. The low prevalence was not associated with disassortative mixing, nor was self-reported STI. Further research into concurrency is needed to fully understand the impact and implication of concurrent partnerships on the spread of STI.

The findings of our study are subject to some limitations. First of all, interview studies have the limitation that interviewers might select favorable answers, possibly resulting in interview bias. We tried to minimize this bias by training the interviewers thoroughly preceding fieldwork (UNAIDS/WHO, 2000). Another potential weakness of this method is that it reaches only the most actively socializing subset of the group of migrants, who may be atypical in their sexual behavior with respect to the group as a whole. In addition, participants in surveys into sexual behavior are generally atypical in being more sexually experienced and less likely to perceive taboos on discussing sex (Dunne et al., 1997). Finally, the recruitment was conducted through convenience sampling in hard-to-reach minority communities, since a random sample was precluded by the anonymous nature of our questionnaire. Such recruitment could have biased the results of our study, although we tried to contact as many community group members as possible, by approaching migrants at different social venues at different times (Ostrow DG & Kessler RC; UNAIDS/WHO). Moreover, we used information of key figures of each migrant community in mapping all possible social venues preceding the actual field work. Despite such limitations, we feel our study gives insight into the associations

between (sexual) characteristics of a community sample of migrant groups and their sexual mixing patterns with indigenous Dutch and non-Dutch.

In conclusion, this study shows substantial disassortative sexual risk behavior among migrant groups in the Netherlands. Since disassortative mixing is more prevalent in second-generation migrants compared to first-generation, it might increase further in the upcoming years. The mixing patterns, the concurrency and the inconsistent condom use found in this study suggest further possible HIV/STI transmission within migrant groups but also between migrant groups. Transmission of HIV between ethnicity groups will probably be minimized by its low prevalence in these groups, but targeted prevention measures are recommended to prevent transmission of other STI. Further mathematical modeling studies are needed to investigate which factors (e.g. sexual risk behavior, HIV prevalence) determine HIV transmission from migrants to the indigenous population in the country they share.

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Table 1 Characteristics of the study population according to sexual mixing pattern.

	Assortative		Disassortative						P-value ^a
	No mixing (group 1) N = 986		Mixing with Dutch (group 2) N = 244		Mixing with non-Dutch (group 3) N = 361		Mixing with Dutch and non-Dutch (group 4) N = 89		
Socio demographic characteristics									
	years	IQR	years	IQR	years	IQR	years	IQR	
Age (median)	30	22-40	28	22-40	24	21-35	23	20-30	< 0.0001
Age at migration (median)	20	13-27	18	12-25	16	8-23	13	6-21	< 0.0001
Years of residence in Netherlands (median)	15	6-21	18	9-24	18	12-22	16	7-20	< 0.0001
HIV prevalence	0.6% [0.2-1.4%]		0.4% [0.0-2.6%]		0.6% [0.1-2.0%]		0.0%		0.07
	N	%	N	%	N	%	N	%	
Male sex	491	50	191	78	224	62	82	92	< 0.0001
Ethnicity									0.002
<i>Hindo-Surinamese</i>	171	17	43	18	46	13	13	15	
<i>Afro Surinamese</i>	200	20	57	23	107	30	22	25	
<i>Antillean</i>	331	34	77	32	115	32	28	31	
<i>Ghanaian</i>	191	19	53	22	46	13	19	21	
<i>Cape Verdeans</i>	93	9	14	6	47	13	7	9	
second-generation migrant	167	17	63	26	110	31	19	21	< 0.0001
Educational level									0.009
<i>Low</i>	97	10	28	12	23	6	7	9	
<i>Middle</i>	748	76	167	69	264	73	72	81	
<i>High</i>	137	14	48	20	73	20	10	11	
Marital status									< 0.0001
<i>Married</i>	183	19	32	13	32	9	3	3	
<i>Co-habiting</i>	219	22	68	28	70	20	20	22	
<i>Single</i>	535	54	134	57	242	68	63	71	
<i>Divorced</i>	38	4	6	2	13	4	2	2	
<i>Widow(er)</i>	4	0.4	1	0.4	1	0.3	1	1	
Sexual characteristics									

Steady partner	818	83	160	66	242	67	50	56	< 0.0001
Duration steady relationship in years (median, IQR)	4	2-10	3	2-7	3	1-5	2	1-3	< 0.0001
Casual partner(s) in past 6 months	287	29	140	57	222	62	89	100	< 0.0001
Concurrent casual partner ^b	100	10	46	19	85	24	37	42	< 0.0001
Condom use (cu)									< 0.0001
1. Consistent cu, all partners	101	10	18	7	35	10	13	15	
2. Inconsistent cu, steady partners (and/or consistent cu casual partners)	729	74	160	65	217	60	38	43	
3. Inconsistent cu, casual partners (with/without consistent cu, steady partner)	149	15	65	27	107	30	38	43	
Number of partners in past 5 years (median, IQR)	2	1-4	3	1-8	4	2-8	8	5-15	< 0.0001
More than 4 partners in the past 6 months	26	3	22	9	38	11	42	47	
Anal sex contacts	161	18	61	19	79	25	18	6	0.003
Commercial sex contact ever	85	9	41	17	47	13	25	28	< 0.0001
STI check-up in past year	166	17	36	15	85	25	19	22	0.01
STI diagnosis in past year ^c	35	21	6	17	18	21	6	32	
Visit to home country in past 5 years	616	63	124	51	201	56	41	46	0.0002
Ever injected drugs	19	2	9	4	6	2	4	5	0.18

^a univariate multinomial regression analysis

^b concurrent casual partner in participants involved in a steady relationship of more than 6 months

^c percentage of those tested for STI in past year

Table 2 Associations with disassortative mixing (n=1680) using multivariate multinomial regression analyses.

	Mixing with Dutch (group 2) N = 244		Mixing with non- Dutch (group 3) N = 361		Mixing with both (group 4) N = 89		Overall p- value
	OR	95% CI	OR	95% CI	OR	95% CI	
Sex & condom use (cu)							< 0.0001
Women & Inconsistent cu, steady partners (consistent cu, casual partners)	0.55	0.37-0.82	0.84	0.62-1.14	0.11	0.02-0.58	
Women & Inconsistent cu, casual partners (with/without consistent cu, steady partner)	0.60	0.31-1.15	1.52	1.01-2.29	1.29	0.50-3.33	
Men & Consistent cu, all partners	0.76	0.41-1.41	0.65	0.39-1.08	1.66	0.75-3.65	
Men & Inconsistent cu, steady partners (consistent cu, casual partners)	1.76	1.30-2.38	1.02	0.78-1.33	1.22	0.66-2.28	
Men & Inconsistent cu, casual partners (with/without consistent cu, steady partner)	2.33	1.54-3.51	1.20	0.83-1.73	2.33	1.54-3.51	
Concurrent casual partner	1.26	1.00-1.56	1.49	1.23-1.81	1.56	1.17-2.06	0.0002
Ethnicity							0.02
Hindo-Surinamese	1.04	0.74-1.45	0.64	0.46-0.88	0.95	0.54-1.66	
Afro-Surinamese	1.43	1.05-1.95	1.41	1.09-1.82	1.27	0.79-2.06	
Antillean	1.10	0.83-1.47	1.08	0.85-1.37	0.86	0.55-1.36	
Ghanaian	1.16	0.84-1.61	0.82	0.60-1.13	1.26	0.76-2.11	
Second-generation migrant	1.26	1.04-1.54	1.34	1.13-1.58	0.94	0.67-1.30	0.001
Educational level							0.02
Middle	0.76	0.61-0.96	0.96	0.77-1.20	1.10	0.73-1.65	
High	1.22	0.91-1.64	1.52	1.16-2.01	0.93	0.54-1.61	
Number of partners in last 5 years							< 0.0001
3 partners	0.78	0.54-1.13	0.98	0.74-1.31	0.76	0.38-1.52	
4-6 partners	1.12	0.82-1.53	1.28	0.99-1.66	1.95	1.20-3.15	
>= 7 partners	1.32	0.98-1.78	1.48	1.13-1.92	3.51	2.24-5.50	
Visit to home country in past 5 years	0.82	0.70-0.96	0.82	0.72-0.94	0.68	0.53-0.87	0.001

Table 3 Associations with disassortative mixing in participants with 2 or more partners (n=557), using multivariate multinomial regression analyses.

	Mixing with Dutch (group 2) N = 105		Mixing with non- Dutch (group 3) N = 175		Mixing with both (group 4) N = 87		Overall p- value
	OR	95% CI	OR	95% CI	OR	95% CI	
Sex & condom use							NA
Women & Inconsistent cu, steady partners (consistent cu, casual partners)	2.58	0.92-7.21	1.07	0.63-1.79	0.53	0.21-1.36	
Women & Inconsistent cu, casual partners (with/without consistent cu, steady partner)	3.25	0.68-15.55	1.27	0.60-2.71	0.36	0.06-2.07	
Men & Consistent cu, all partners	4.03	1.26-12.92	1.01	0.52-1.94	2.55	1.13-5.75	
Men & Inconsistent cu, steady partners (consistent cu, casual partners)	14.33	NA	1.52	0.98-2.36	2.48	1.30-4.72	
Men & Inconsistent cu, casual partners (with/without consistent cu, steady partner)	11.70	6.79-20.17	0.88	0.58-1.36	1.52	0.80-2.88	
Visit to home country in past 5 years	0.80	0.62-1.02	0.81	0.65-1.00	0.68	0.52-0.88	0.03

NA = Not accountable (infinite)